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Molding Procedure for Casting a Variety of Alloys

The problem:

To develop a general procedure and a molding sand composition for preparing molds that can be used for casting a variety of alloys.

The solution:

Molds prepared in accordance with a standardized procedure from a mixture of sand and a self-setting binder system of the following composition, in pounds:

- 100, sand GFN 50-70
- 3, sodium silicate binder (liquid)
- 0.4, organic liquid ester

How it's done:

The sand and the sodium silicate binder are blended in a suitable mixer until all silicate lumps have disappeared (5 to 10 minutes). The ester is added, and blended into the mixture (about 1 minute). The composition is placed in the molding flask containing the pattern. The composition starts to set within 30 minutes and is hard within 2 to 3 hours. At the end of this period, the molds are heated at 250°F for 2 hours to eliminate any moisture, and the pattern is removed. The cope and drag are closed prior to pouring metal.

Notes:

1. The ester accelerates the setting and hardening of the sand and binder.

2. The proper directional solidification of castings is achieved by conventional techniques with gates and risers.
3. Castings which have been made using this molding procedure are in the 1- to 100-pound range with section thicknesses of 1/8 to 3 inches. The castings are machined to achieve proper finish and dimensions.
4. Castings of radiographic quality have been produced from the following alloys: 309 stainless steel, 17-4PH stainless steel, Waspaloy PWA-652, Hastelloy GMR-235D, Inconel 625, Aluminum 195, 356, KO-1, Berylco 33-20C, and Navy bronze. Many other alloys could be used with this process.
5. No additional documentation is available. Specific questions, however, may be directed to:
Technology Utilization Officer
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Reference: B70-10512

Patent status:

No patent action is contemplated by NASA.

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